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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,464	01/21/2004	Paul Rich	WLJ.099	1392

20987 7590 03/18/2008

VOLENTINE & WHITT PLLC
ONE FREEDOM SQUARE
11951 FREEDOM DRIVE SUITE 1260
RESTON, VA 20190

EXAMINER	
MCDONALD, RODNEY GLENN	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
03/18/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/760,464	RICH ET AL.	
	Examiner	Art Unit	
	Rodney G. McDonald	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mohn et al. (EP 0 708 478) in view of Francis (U.S. Pat. 6,465,353).

Regarding claim 1, Mohn et al. teach an apparatus for processing a substrate including a chamber 10, a plasma creation element 12 for creating a plasma in a zone of the chamber and an electrostatic chuck for retaining a substrate 34 at a location in or adjacent to the zone such that an upper surface of the substrate 34 faces away from the chuck. The apparatus further includes a shield 26 disposed on the zone side of the chuck overlying the peripheral portion of the upper surface of the substrate 34 at the

location for preventing the presence of a plasma between the shield and the periphery portion of the upper surface of the substrate at the location whilst allowing processing of the substrate. (Column 3 lines 15-21; Column 4 lines 26-41; Column 5 lines 16-58; Column 6 lines 1-12) Mohn et al. teach that the shield can be electrically conducting since it can be made of SiC. (Column 3 lines 53)

Regarding claim 2, Mohn et al. teach that the shield is generally annular and circumjacent the chuck. (See Fig. 3)

Regarding claim 7, Mohn et al. teach a method of processing a substrate including electrostatically clamping the substrate to the chuck, creating a plasma adjacent the outwardly facing face of the clamped substrate, and locating a shield overlying the periphery of the outwardly facing face of the clamped substrate to prevent the presence of plasma between the shield and the periphery while processing the substrate. (Column 3 lines 15-21; Column 4 lines 26-41; Column 5 lines 16-58; Column 6 lines 1-12) Mohn et al. teach that the shield can be electrically conducting since it can be made of SiC. (Column 3 lines 53)

The differences between Mohn et al. and the present claims is that the plasma guard being a dark space shield is not discussed (Claims 1, 7) and the thickness of the substrate wafer is not discussed (Claims 1, 7, 8).

Regarding the plasma guard being a dark space shield (Claims 1, 7), The Examiner considers the plasma guard to be a dark space shield since the plasma guard does exactly what the claims require which is to prevent the presence of plasma

between the shield and the periphery portion of the upper surface of the substrate. (Column 3 lines 15-21)

Regarding the thickness of the wafer in claims 1, 7 and 8, Francis teach that semiconductor devices need thin wafers for processing. The thickness can be about 100 microns or less. (Column 1 lines 13-26, lines 39-60; Column 2 lines 38-42)

The motivation for utilizing the feature of Francis is that it allows processing wafers for semiconductor dies. (Column 1 lines 39-40)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Mohn et al. by utilizing the features of Francis because it allows for processing semiconductor wafer dies.

Claims 4-6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mohn et al. in view of Francis as applied to claims 1, 2, 7 and 8 above, and further in view of Weichart et al. (U.S. PG PUB. 2003/0075522 A1).

The differences not yet discussed grounding the shield (Claims 4, 11), connecting the chuck as a plasma creating element (Claim 5) and powering the chuck (Claim 6).

Regarding claims 4, 11, Weichart et al. teach connecting a dark space shield 5b to ground. (Page 4 paragraph 0043)

Regarding claim 5, Weichart et al. teach that a chuck can also be a plasma creating element. (Page 4 paragraph 0042, paragraph 0043)

Regarding claim 6, Weichart et al. teach that a chuck can be powered. (Page 4 paragraph 0042, paragraph 0043)

The motivation for utilizing the features of Weichart et al. is that it allows for producing a high density plasma. (Paragraph 0011)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Weichart et al. because it allows for producing a high density plasma.

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mohn et al. in view of Francis as applied to claims 1, 2, 7 and 8 above, and further in view of Kravitz et al. (U.S. Pat. 4,426,246) or Keyser et al. (U.S. Pat. 4,762,728).

The difference not yet discussed is where the material forming the shield is a metal (Claims 9, 10) and grounded the shield is not discussed (Claim 11).

Regarding claims 9, 10, Mohn et al. teach materials for the shield can be silicon carbide as discussed above or any other high heat and high strength material. (See Mohn et al. Column 3 lines 52-54) Kravitz et al. teach that a dark space shield can be made of a high heat and high strength material such as metal. (Column 6 lines 51-59) Keyser et al. teach that a dark space shield can be made of a high heat and high strength material such as aluminum or stainless steel. (Column 4 lines 29-32)

Regarding claim 11, Kravitz et al. teach grounding the dark space shield. (Column 6 lines 56-59) Keyser et al. teach grounding the shield. (Column 4 lines 30-32)

The motivation for utilizing the features of Kravitz et al. is that it allows for preventing discharge form occurring at the sides and the bottom of the electrode. (Column 6 lines 51-59)

The motivation for utilizing the features of Keyser et al. is that it allows for protecting the electrode. (Column 6 lines 51-59)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Kravitz et al. or Keyser et al. because it allows for preventing discharge from occurring at the substrate holder or protecting the electrode.

Claims 1, 2, 4-8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weichart et al. (US PGPUB 2003/0075522 A1) in view of Francis (U.S. Pat. 6,465,353) and Arnold et al. (U.S. Pat. 5,423,971) or Scherer (GB 2310433) or Mohn et al. (EP 0 708 478).

Regarding claim 1, Weichart et al. teach an apparatus for processing a substrate wafer including a chamber 1. (Page 4 paragraph 0044) A plasma creation element 2 for creating a plasma in a zone of the chamber. (Page 2 paragraph 0022) An electrostatic chuck for retaining a substrate at a substrate location in or adjacent to the zone. (Page 4 paragraph 0041) The apparatus includes a dark space shield 5b circumjacent the periphery of the location for preventing the presence of the plasma between the shield and the periphery of a substrate in the location whilst allowing processing of the substrate. (Page 4 paragraph 0041; paragraph 0043) Weichert et al. describe the shield 5b as electrically conducting. (Page 4 paragraph 0041, paragraph 0043)

Regarding claim 2, Weichart et al. describes the shield 5b as generally annular. (Page 4 paragraph 0041)

Regarding claim 4, Weichart et al. teach that the shield 5b is grounded. (Page 4 paragraph 0043)

Regarding claim 5, Weichart et al. teach that the chuck is also a plasma creating element. (Page 4 paragraph 0042, paragraph 0043)

Regarding claim 6, Weichart et al. teach that the chuck is powered. (Page 4 paragraph 0042, paragraph 0043)

Regarding claim 7, Weichart et al. teach a method for processing a wafer. (Page 4 paragraph 0046) Including electrostatically clamping the substrate to the chuck. (Page 4 paragraph 0041) Creating a plasma adjacent to the outwardly facing face of the clamped substrate and locating a dark space shield between the plasma and the periphery of the substrate to prevent the presence of plasma between the shield and the periphery whilst allowing processing of the substrate. (Page 2 paragraph 0022; Page 4 paragraph 0045) Weichart et al. describe the shield 5b as electrically conducting. (Page 4 paragraph 0041, paragraph 0043)

Regarding claim 11, Weichart et al. teach that the shield 5b is grounded. (Page 4 paragraph 0043)

The differences between Weichart et al. and the present claims is that the thickness of the wafer substrate is not discussed (Claims 1, 7 and 8) and the dark space shield overlying a peripheral portion of the upper surface of the substrate is not discussed (Claims 1, 7)

Regarding the thickness of the wafer in claims 1, 7 and 8, Francis teach that semiconductor devices need thin wafers for processing. The thickness can be about 100 microns or less. (Column 1 lines 13-26, lines 39-60; Column 2 lines 38-42)

The motivation for utilizing the feature of Francis is that it allows processing wafers for semiconductor dies. (Column 1 lines 39-40)

Regarding claims 1, 7, Arnold et al. teach that a dark space shield should overlie a periphery of the substrate 17. (See Abstract; Fig. 1) Scherer teach locating a dark space shield (i.e. 6 coupled to 14) overlying a periphery of the substrate. (See Abstract; Figure) Mohn et al. teach that a dark space shield 26 should overlie a periphery of the substrate. (See Mohn et al. discussed above)

The motivation for utilizing the features of Arnold et al. is that it allows for preventing formation of parasitic plasmas. (See Abstract)

The motivation for utilizing the features of Scherer is that it allows for inhibiting defects in the film. (Page 2 para. 2, 3)

The motivation for utilizing the features Mohn et al. is that it allows for preventing plasma to effect the electrostatic chuck. (Page 3 lines 15-21)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Weichart et al. by utilizing the feature of Francis and Arnold et al. or Scherer or Mohn et al. because it allows for processing wafers for semiconductor dies and preventing formation of paristic plasmas, inhibiting defects in the films and preventing damage to the electrostatic chuck.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weichart et al. in view of Francis and Arnold et al. or Scherer or Mohn et al. as applied to claims 1, 2, 4-8 and 11 above, and further in view of Kravitz et al. (U.S. Pat. 4,426,246) or Keyser et al. (U.S. Pat. 4,762,728).

The difference not yet discussed is where the material forming the shield is a metal. (Claims 9, 10)

Regarding claims 9, 10, Mohn et al. teach materials for the shield can be silicon carbide as discussed above or any other high heat and high strength material. (See Mohn et al. Column 3 lines 52-54) Kravitz et al. teach that a dark space shield can be made of a high heat and high strength material such as metal. (Column 6 lines 51-59) Keyser et al. teach that a dark space shield can be made of a high heat and high strength material such as aluminum or stainless steel. (Column 4 lines 29-32)

The motivation for utilizing the features of Kravitz et al. is that it allows for preventing discharge form occurring at the sides and the bottom of the electrode. (Column 6 lines 51-59)

The motivation for utilizing the features of Keyser et al. is that it allows for protecting the electrode. (Column 6 lines 51-59)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Kravitz et al. or Keyser et al. because it allows for preventing discharge from occurring at the substrate holder or protecting the electrode.

Response to Arguments

Applicant's arguments filed December 11, 2007 have been fully considered but they are not persuasive.

In response to the argument that SiC is not electrically conducting, it is argued that SiC is electrically conducting. As evidenced by the attached article to Terashiga et al. SiC is shown to exhibit electrical conductivity and would qualify as an electrical conductor since it capable of conducting some electricity. Assuming arguendo that SiC is an insulator as Applicant argues Mohn et al. also suggest that the shield be made of any other high heat and high strength materials. Metals fall in this category. Newly cited references to Keyser et al. and Kravitz et al. for teaching dark space shields made of metal material show such high heat and high strength materials for dark space shields. (See Mohn et al., Keyser et al. and Kravitz et al. discussed above)

In response to the argument that it would not be obvious to ground the shield of Mohn et al. because it is an insulator, it is argued as discussed above that SiC is considered to be an electrical conductor therefore one of ordinary skill in the art would look to Wiechart et al. to ground the dark space shield. (See Mohn et al. and Wiechart et al. discussed above)

In response to the argument that one of ordinary skill in the art would not combine the fixed process location of Wiechart et al. with the moving substrate of Arnold, it is argued that one of ordinary skill in the art when looking at Arnold would incorporate the dark space shield features in order to prevent parasitic plasmas. (See Wiechart et al. and Arnold discussed above)

In response to the argument that one of ordinary skill in the art would not combine the fixed process location of Wiechart et al. with the moving substrate of Scherer, it is argued that one of ordinary skill in the art when looking at Scherer would incorporate the dark space shield features in order to damage to the substrate holder. (See Wiechart et al. and Scherer discussed above)

In response to the argument that one of ordinary skill in the art would not combine Mohn et al. with Wiechart et al. because the Mohn et al.' s ring is electrically insulating, it is argued as discussed above that SiC can be considered to be electrically conducting. However assuming arguendo that SiC is insulating Mohn et al. also suggest that the shield be made of any other high heat and high strength materials. Clearly Wiechart et al.'s electrically conductive dark space shield falls into this category. (See Mohn et al., Keyser et al. and Kravitz et al. discussed above)

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Terashige et al. "Influence of Microstructural Variation on the Electrical Properties of SiC Microthermistors", IEEE Transactions on Electron Devices, Vol. 46, No. 3, pp. 555-560, March 1999.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M-Th with every Friday off..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rodney G. McDonald/
Primary Examiner, Art Unit 1795

Rodney G. McDonald
Primary Examiner
Art Unit 1795

RM
March 12, 2008